

### **CLAIM AMENDMENTS**

This listing of claims will replace all prior versions and listings of claims in the application.

#### **Listing of Claims**

1. (Currently Amended) A method of monitoring and diagnosing resource utilization within a connection oriented network made of network elements, at least one of said network elements including a connection resource tracker for maintaining a database of resource utilization, comprising the steps of:
  - a. specifying a plurality of resource types for the network elements of the network, ~~a each resource~~ type being defined by a capacity limit and a utilization;
  - b. providing a utilization threshold and a specified threshold for each specified type of resource, wherein the utilization threshold is set at a high value used to determine whether resources are being over-utilized and the specified threshold is set at a high value used to determine whether resources used are exceeding a maximum allowable limit;
  - c. measuring the utilization for all resources at ~~a the~~ network elements;
  - d. in response to a query from a user relating to a particular type of resource, comparing the utilization for all resources of the particular type as measured in step ~~e) c.~~ with the utilization threshold for said particular type for determining whether the utilization of any resource of said particular type is above the corresponding utilization threshold; ~~and~~
  - e. if the utilization is above the corresponding utilization threshold for at least one said resource, generating a report and identifying in the report each resource of the particular type for which the utilization is above the corresponding utilization threshold and presenting the report to an operator

of said network; and

f. if the utilization is above the corresponding specified threshold for at least one said resource, checking a timer associated with the connection resource tracker, and generating an alarm only if the timer has expired.

2. (Currently Amended) The method of claim 1 wherein the plurality of ~~resources~~ resource types includes at least one of bandwidth, line card capacity, number of connection end points per line card, Virtual Path Identifier numbers, Virtual Connection Identifier numbers, MultiProtocol Label Switching (MPLS) label numbers, memory within the switch, number of supportable leaf endpoints per system, number of supportable connections in a connecting state, number of MPSP state blocks, and number of connections in a database.

3. (Currently Amended) The method of claim 1 wherein step d. is carried out only with respect to resources within ~~the~~ a list of resources.

4. (Original) The method of claim 3 wherein the step of providing at least one utilization threshold comprises receiving at least one utilization threshold from an operator.

5. (Canceled)

6. (Previously Presented) The method of claim 1 wherein the step e. comprises receiving at least one utilization threshold from an operator.

7. (Previously Presented) The method of claim 1 wherein the step e. further comprises including the utilization of any identified resources in the report.

8. (Previously Presented) The method of claim 7 further comprising step a. including:

providing a list of resources, the list of resources including at least one of bandwidth, line card capacity, number of connection end points per line card, Virtual Path Identifier numbers, Virtual Connection Identifier numbers, MultiProtocol Label Switching (MPLS) label numbers, memory within the switch, number of supportable leaf endpoints per system, number of supportable connections in a connecting state, number of MPLS state blocks, and number of connections in a database;

wherein the step e. is carried out only with respect to resources within the list of resources, and wherein the step of providing at least one utilization threshold comprises receiving at least one utilization threshold from an operator.

9. (Currently Amended) The method of claim 1 further comprising the steps of:

f.g. upon identification of a resource for which the utilization is above ~~the corresponding utilization~~ the specified threshold, generating an alarm identifying the resource; and

g.h. presenting the alarm to an operator.

10. (Currently Amended) The method of ~~claim 9~~ claim 1 wherein the step of providing at least one utilization threshold comprises receiving at least one utilization threshold from an operator.

11. (Currently Amended) The method of ~~claim 9~~ claim 1 wherein the step of determining whether a utilization of a resource is above the corresponding utilization threshold and the step of identifying each such resource are carried out

repeatedly.

12. (Currently Amended) The method of ~~claim 11~~ claim 1 further comprising ~~the a~~ step of pausing after the step of identifying each resource for which the utilization is above the corresponding utilization threshold.

13. (Currently Amended) The method of ~~claim 9~~ claim 1 comprising the further step of:

~~h.i.~~ monitoring for receipt of call connection establishment signals;  
and wherein the step of determining whether a utilization of a resource is above the corresponding utilization threshold and the step of identifying each such resource are carried out only upon receipt of a call connection establishment signal.

14. (Currently Amended) The method of claim 13 comprising the further step of:

~~h.j.~~ determining whether an alarm has been generated since the utilization of the resource last rose above ~~the corresponding utilization~~ the specified threshold;  
and wherein the step of generating an alarm is carried out only if an alarm has not been generated since the utilization of the resource last rose above the ~~corresponding utilization~~ specified threshold.

15. (Original) The method of claim 14 wherein the step of generating a report further comprises including the utilization of any identified resources in the report.

16. (Currently Amended) The method of claim 15 further wherein step a. includes:

providing a list of resources, the list of resources including at least one of bandwidth, line card capacity, number of connection end points per line card, Virtual Path Identifier numbers, Virtual Connection Identifier numbers,

MultiProtocol Label Switching (MPLS) label numbers, memory within the switch, number of supportable leaf endpoints per system, number of supportable connections in a connecting state, number of MPLS state blocks, and number of connections in a database; and

wherein the step of determining whether a utilization of a resource is above the corresponding utilization threshold is carried out only with respect to resources within the list of resources, and wherein the step of providing at least one utilization threshold comprises receiving at least one utilization threshold from an operator.

17. (Currently Amended) A processor for monitoring resource utilization within a connection oriented switch made of network elements, at least one of said network elements including a connection resource tracker for maintaining a database of resource utilization, comprising:

- a. instructions for specifying a plurality of resource types for the network elements of the network, ~~a~~each resource type being defined by a capacity limit and a utilization;
- b. instructions for providing a utilization threshold and a specified threshold for each specified type of resource, wherein the utilization threshold is set at a high value used to determine whether resources are being over-utilized and the specified threshold is set at a high value used to determine whether resources used are exceeding a maximum allowable limit;
- c. instructions for measuring the utilization for all resources at ~~a~~the network elements;
- d. instructions for, in response to a query from a user relating to a particular type of resource in said database, comparing the utilization for all resources of the particular type as measured in step ~~e~~c, with the utilization threshold

for said particular type for determining whether the utilization of any resource of said particular type is above the corresponding utilization threshold;~~and~~

e. instructions for, if the utilization is above the corresponding utilization threshold for at least one said resource, generating a report and identifying in the report each resource of the particular type for which the utilization is above the corresponding utilization threshold and presenting the report to an operator of said network; and

f. instructions for, if the utilization is above the corresponding specified threshold for at least one said resource, checking a timer associated with the connection resource tracker, and generating an alarm only if the timer has expired.

18. (Previously Presented) The processor claim 17 wherein the plurality of resources includes at least one of bandwidth, line card capacity, number of connection end points per line card, Virtual Path Identifier numbers, Virtual Connection Identifier numbers, MultiProtocol Label Switching (MPLS) label numbers, memory within the switch, number of supportable leaf endpoints per system, number of supportable connections in a connecting state, number of MPLS state blocks, and number of connections in a database.

19. (Original) The processor of claim 17 further comprising instructions for providing a list of resources, and wherein the instructions for determining whether a utilization of a resource is above the corresponding utilization threshold make this determination only with respect to resources within the list of resources.

20. (Original) The processor of claim 19 wherein the instructions for providing at

least one utilization threshold comprise instructions for receiving at least one utilization threshold from an operator.

21. (Canceled)

22. (Previously Presented) The processor of claim 17 wherein the instructions for providing at least one utilization threshold comprise instructions for receiving at least one utilization threshold from an operator.

23. (Currently Amended) The processor of claim 17 wherein the instructions for generating thea report further comprise instructions for including the utilization of any identified resources in the report.

24. (Previously Presented) The processor of claim 23 further comprising:

- a. instructions for providing a list of resources, the list of resources including at least one of bandwidth, line card capacity, number of connection end points per line card, Virtual Path Identifier numbers, Virtual Connection Identifier numbers, MultiProtocol Label Switching (MPLS) label numbers, memory within the switch, number of supportable leaf endpoints per system, number of supportable connections in a connecting state, number of MPLS state blocks, and number of connections in a database;

wherein the instructions for determining whether a utilization of a resource is above the corresponding utilization threshold are executed only with respect to resources within the list of resources, and wherein the instructions for providing at least one utilization threshold comprise instructions for receiving at least one utilization threshold from an operator.

25. (Currently Amended) The processor of claim 17 further comprising:

- a. instructions for, upon identification of a resource for which the utilization is above ~~the corresponding~~the utilization specified threshold, generating an alarm identifying the resource; and
- b. instructions for presenting the alarm to an operator.

26. (Original) The processor of claim 25 wherein the instructions for providing at least one utilization threshold comprise instructions for receiving at least one utilization threshold from an operator.

27. (Original) The processor of claim 25 further comprising instructions for executing the instructions for determining whether a utilization of a resource is above the corresponding utilization threshold and the instructions for identifying each such resource repeatedly.

28. (Original) The processor of claim 27 further comprising instructions for pausing after the instructions for identifying each resource for which the utilization is above the corresponding utilization threshold are executed.

29. (Previously Presented) The processor of claim 25 further comprising:

- a. instructions for monitoring for receipt of call connection establishment signals; and
- b. instructions for executing the instructions for determining whether a utilization of a resource is above the corresponding utilization threshold and the instructions for identifying each such resource upon receipt of a call connection establishment signal.



30. (Currently Amended) The processor of claim 29 further comprising:

- a. instructions for determining whether an alarm has been generated since the utilization of the resource last rose above the corresponding ~~utilization~~ specified threshold; and

instructions for executing the instructions for generating an alarm only in the event that an alarm has not been generated since the utilization of the resource last rose above the corresponding ~~utilization~~ specified threshold.

31. (Original) The processor of claim 30 wherein the instructions for generating a report further comprise instructions for including the utilization of any identified resources in the report.

32. (Original) The processor of claim 31 further comprising:

- a. instructions for providing a list of resources, the list of resources including at least one of bandwidth, line card capacity, number of connection end points per line card, Virtual Path Identifier numbers, Virtual Connection Identifier numbers, MultiProtocol Label Switching (MPLS) label numbers, memory within the switch, number of supportable leaf endpoints per system, number of supportable connections in a connecting state, number of MPLS state blocks, and number of connections in a database;

wherein the instructions for determining whether a utilization of a resource is above the corresponding utilization threshold are executed only with respect to resources within the list of resources, and wherein the instructions for providing at least one utilization threshold comprise instructions for receiving at least one utilization threshold from an operator.

33. (Currently Amended) A computer-readable medium comprising instructions for monitoring resource utilization within a connection oriented network made of network connections, at least one of said network elements including a connection resource tracker for maintaining a database of resource utilization, comprising:

- a. instructions for specifying a plurality of resource types for the network elements of the network, ~~a each resource type~~ being defined by a capacity limit and a utilization;
- b. instructions for providing a utilization threshold and a specified threshold for each specified type of resource, wherein the utilization threshold is set at a high value used to determine whether resources are being over-utilized and the specified threshold is set at a high value used to determine whether resources used are exceeding a maximum allowable limit;
- c. instructions for measuring the utilization for all resources at a network element;
- d. instructions for, in response to a query from a user relating to a particular type of resource in said database, comparing the utilization for all resources of the particular type as measured in step ~~e)c.~~ with the utilization threshold for said particular type for determining whether the utilization of any resource of said particular type is above the corresponding utilization threshold;~~and~~
- e. instructions for, if the utilization is above the corresponding utilization threshold for at least one said resource, generating a report and identifying in the report each resource fo the particular type for which the utilization is above the corresponding utilization threshold and presenting the report to an operator of said network-; and
- f. instructions for, if the utilization is above the corresponding specified threshold for at least one said resource, checking a timer associated with the

connection resource tracker, and generating an alarm only if the timer has expired.

34. (Currently Amended) A method of monitoring resource utilization within a connection oriented network made of network elements, at least one of said network element including a connection resource tracker for maintaining a database of resource utilization, comprising the steps of:

- a. specifying a plurality of resource types for the network elements of the network, ~~a~~each resource type being defined by a capacity limit and a utilization;
- b. providing a utilization threshold and a specified threshold for each specified type of resource, wherein the utilization threshold is set at a high value used to determine whether resources are being over-utilized and the specified threshold is set at a high value used to determine whether resources used are exceeding a maximum allowable limit;
- c. measuring the utilization threshold for all resources at a network element;
- d. in response to a query from a user relating to a particular type of resource in said database, comparing the utilization for all resources of the particular type as measured in step ~~e~~c, with the utilization threshold for said particular type for determining whether the utilization of any resource of said particular type is above the corresponding utilization threshold; ~~and~~
- e. if the utilization is above the corresponding utilization threshold for at least one said resource, generating a report and identifying in the report each resource of the particular type for which the utilization is above the corresponding utilization threshold and presenting the report to an operator of said network; and
- f. if the utilization is above the corresponding specified threshold for at least

one said resource, checking whether a flag associated with the resource indicates that an alarm has recently been generated for the resource and, if the flag does not indicate that the alarm has recently been generated, generating an alarm and setting a flag to indicate that an alarm has recently been generated.

35. (Canceled)

36. (Currently Amended) The method of ~~claim 35~~ claim 34 wherein the step of providing at least one utilization threshold comprises receiving at least one utilization threshold from an operator.

37. (Original) The method of claim 36 further comprising the step of providing a list of resources, and wherein the step of determining whether a utilization of a resource is below the corresponding utilization threshold is carried out only with respect to resources within the list of resources.

38. (Currently Amended) The method of claim 37 wherein the step of generating a the report further comprises including the utilization of any identified resources in the report.

39. (Currently Amended) A processor for monitoring resource utilization within a connection oriented network made of network elements, at least one of said network elements including a connection resource tracker for maintaining a database of resource utilization, comprising:

- a. instructions for specifying a plurality of resource types for the network elements of the network, ~~a~~each resource type being defined by a capacity limit and a utilization;
- b. instructions for providing a utilization threshold and a specified threshold for each specified type of resource, wherein the utilization threshold is set at a high value to determine whether resources are being over-utilized and the specified threshold is set at a high value used to determine whether resources used are exceeding a maximum allowable limit;
- c. instructions for measuring the utilization for all resources at ~~a~~the network element;
- d. instructions for, in response to a query from a user relating to a particular type of resource in said database, comparing the utilization for all resources of the particular type as measured in step ~~e~~c. with the utilization threshold for said particular type for determining whether the utilization of any resource of said particular type is above the corresponding utilization threshold;~~and~~
- e. instructions for, if the utilization is above the corresponding utilization threshold for at least one said resource, generating a report and identifying in the report each resource of the particular type for which the utilization is above the corresponding utilization threshold and presenting the report to an operator of said network; and
- f. instructions for, if the utilization is above the corresponding specified threshold for at least one said resource, checking whether a flag associated with the resource indicates that an alarm has recently been generated for the resource, and if the flag does not indicate that the alarm has recently been generated, generating an alarm and setting a flag to indicate that an alarm has recently been generated.

40. (Canceled)

41. (Previously Presented) The processor of claim 39 wherein the instructions for providing at least one utilization threshold comprise instructions for receiving at least one utilization threshold from an operator.

42. (Original) The processor of claim 41 further comprising instructions for providing a list of resources, and wherein the instructions for determining whether a utilization of a resource is below the corresponding utilization threshold are executed only with respect to resources within the list of resources.

43. (Currently Amended) The processor of claim 42 wherein the instructions for generating a ~~the~~ report further comprise instructions for including the utilization of any identified resources in the report.

44. (Currently Amended) A computer-readable medium comprising instructions for monitoring resource utilization within a connection oriented network made of network elements, at least one of said network elements including a connection resource tracker for maintaining a database of resource utilization, comprising:

- a. instructions for specifying a plurality of resource types for the network elements of the network, ~~a~~ each resource type being defined by a capacity limit and a utilization;
- b. instructions for providing a utilization threshold and a specified threshold for each specified type of resource, wherein the utilization threshold is set at a high value used to determine whether resources are being over-utilized and

- the specified threshold is set at a high value used to determine whether resources used are exceeding a maximum allowable limit;
- c. instructions for measuring the utilization for all resources at a the network element;
- d. instructions for, in response to a query from a user relating to a particular type of resource in said database, comparing the utilization for all resources of the particular type as measured in step e) c. with the utilization threshold for said particular type for determining whether the utilization of any resource of said particular type is above the corresponding utilization threshold; and
- e. instructions for, if the utilization is above the corresponding utilization threshold for at least one said resource, generating a report and identifying in the report each resource of the particular type for which the utilization is above the corresponding utilization threshold and presenting the report to an operator of said network; and
- f. instructions for, if the utilization is above the corresponding specified threshold for at least one said resource, checking whether a flag associated with the resource indicates that an alarm has recently been generated for the resource and if the flag does not indicate that the alarm has recently been generated, generating an alarm and setting a flag to indicate that an alarm has recently been generated.

45. (New) A method of monitoring and diagnosing resource utilization within a connection oriented network made of network elements, at least one of said network elements including a connection resource tracker for maintaining a database of resource utilization, comprising the stops of:

- a. specifying a plurality of resource types for the network elements of the network, each resource type being defined by a capacity limit and a utilization;
- b. providing a utilization threshold and a specified threshold for each specified type of resource, wherein the utilization threshold is set at a low value used to determine whether resources are being under-utilized and the specified threshold is set at a low value used to determine whether resources used are below a minimum allowable limit;
- c. measuring the utilization for all resources at a network elements;
- d. in response to a query from a user relating to a particular type of resource, comparing the utilization for all resources of the particular type as measured in step c. with the utilization threshold for said particular type for determining whether the utilization of any resource of said particular type is below the corresponding utilization threshold;
- e. if the utilization is below the corresponding utilization threshold for at least one said resource, generating a report and identifying in the report each resource of the particular type for which the utilization is below the corresponding utilization threshold and presenting the report to an operator of said network; and
- f. if the utilization is below the corresponding specified threshold for at least one said resource, checking a timer associated with the resource tracker, and generating an alarm if the timer has expired.

46. (New) A method of monitoring resource utilization within a connection oriented network made of network elements, at least one of said network element including a connection resource tracker for maintaining a database of resource utilization, comprising the steps of:



- a. specifying a plurality of resource types for the network elements of the network, each resource type being defined by a capacity limit and a utilization;
- b. providing a utilization threshold and a specified threshold for each specified type of resource, wherein the utilization threshold is set at a low value used to determine whether resources are being under-utilized and the specified threshold is set at a low value used to determine whether resources used are below a minimum allowable limit;
- c. measuring the utilization threshold for all resources at a network element;
- d. in response to a query from a user relating to a particular type of resource in said database, comparing the utilization for all resources of the particular type as measured in step c. with the utilization threshold for said particular type for determining whether the utilization of any resource of said particular type is below the corresponding utilization threshold;
- e. if the utilization is below the corresponding utilization threshold for at least one said resource, generating a report and identifying in the report each resource of the particular type for which the utilization is below the corresponding utilization threshold and presenting the report to an operator of said network; and
- f. if the utilization is below the corresponding specified threshold for at least one said resource, checking whether a flag associated with the resource indicates that an alarm has recently been generated for the resource, and, if the flag does not indicate that the alarm has recently been set, generating an alarm and setting a flag to indicate that an alarm has recently been generated.